

COWRIES

(MOLLUSCA, GASTROPODA: FAMILY CYPRAEIDAE)

BY

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(*With two plates*)

INTRODUCTION

While a Research Scholar in the Zoological Survey of India I read a paper entitled 'A talk about Cowries' at a meeting of the Indian Association of Systematic Zoologists held at Kaiser Castle, Banaras Cantt., on 21-5-48. This article is adapted from the above and gives an account of the systematics, habits and habitats, transformation, use, dissolving of the shell, etc. of Cowries which are so well known to mankind.

The Cowries are marine molluscs which constitute the well-known family Cypraeidae. There is no group in Mollusca which appears to have excited more curiosity and admiration than the Cowries. These forms present remarkable variety of colouration and markings as well as sculpture on their shells in close harmony with the corals, which are really objects of great beauty and delight. The changes which the shells exhibit regarding form and colour at different phases of their growth are so striking and dissimilar that it is difficult to find out the true link between them unless carefully studied from the very beginning. This is how the naturalists and scientists in early days got puzzled and wrongly treated the young and adult of the same species as belonging to different forms. The animal is also gifted with the curious faculty of dissolving or decomposing (with its acetose juices) any portion of the shell that is liable to resist the advancement of its growth, and of renewing it. It may take time for a cowry to attain its full development, but the re-calcification of a shell at a maturer age is said to be the work of a few days only. These may be the facts which possibly created an unusual interest in men to study the cowries, to utilize the animal as food or otherwise and also to use their shells (mainly composed of carbonate of lime secreted by the mantle itself) for the purpose of decoration, ornamentation, games, defence, etc.

SYSTEMATICS

The admirable contributions of Lister (1685—*Hist. Conchyl.*) Rumphius (1705—*Amb. Rarit. Kam.*), Petiver (1711—*Gazophyllacium* Vol. I), Gualtieri (1735—*Index Test. Conchyl.*), Adanson (1757—*Hist. Nat. Senegal Coq.*) and others on the iconography of cowries and other shells appear to have evoked considerable interest in the

study of molluscs in the 17th and 18th century and thus helped conchology in gaining more popularity and confidence as an important subject among the natural sciences. But the real work on the systematics of cowries was started with the introduction of binomial nomenclature by Linnaeus in his *Syst. Nat.* ed. X, 1758, which placed them under the new generic name of *Cypraea* (p. 718). It is perhaps so named, says Perry (1811—Conchology), 'from the circumstance of a beautiful shell of this genus, having, as it is said, been presented to the temple of Venus at Cyprus—a luxuriant and smiling island in the Mediterranean teeming with industrial wealth; and, indeed, the beauty and splendour of these shells render them worthy of being offered at the shrine of the Goddess of Beauty'. Dr. J. C. Melvill in his comprehensive work on cowries published in *Mem. and Proc. Manchest. Lit. and Phil. Soc.* Ser. 4, Vol. I, pp. 184-185 (1888) gives plausible explanations of this important usage. It was Fleming (1828) who took keen interest in the study of cowries and erected the new family Cypraeidae for their reception. But unfortunately he failed to separate them from the smaller Nun cowries which also live in close association with the former in the sea. However, this difference of great taxonomic value was detected before long by Gray, in 1832, on the basis of which he separated the Nuns entirely from *Cypraea* and instituted the new genus *Trivia* for their accommodation in his Descriptive Catalogue of Shells. Now, the 'Trivias', like the cowries, have also been given a separate family rank (Triviidae) owing to the remarkable features noticeable in their shell-characters, i.e. there are fine transverse ribs (Pl. I, Fig. 5, tr. r.) on the surface of their shells (the anterior and posterior ones being vertical) which are interrupted in the middle by a longitudinal groove (m. gr.); these ribs are nothing but mere prolongations of the denticulations (Fig. 6, d.) found on the lips below (o.l., o.l.).

Linnaeus described only 42 species of cowries in his *Syst. Nat.*, pp. 718-725, under the single genus *Cypraea*. But as a result of extensive studies in the field in the course of about 200 years the number of species of living Cypraeidae has now risen nearly to 170 with more than 250 subspecies under them relegated to 56 or more genera and 13 sub-families. The works published by Kiener (1843—*Icon. Coq. Viv.*), Reeve (1845-1846—*Conch. Icon.* Vol. III), Sowerby (1870—*Thes. Conchyl.* Vol. IV.), Weinkauff (1881—Martini and Chemnitz's *Conch.-Cab.* Vol. V, Abth. 3) and Roberts (1885—in Tryon's *Man. Conch.* Vol. VII) are illustrated with beautiful diagrams bearing natural colouration and markings which help in the identification of the cowries, while those by Hidalgo (1904-1905—*Test. Moll. Filipinas*; 1906-1907—*Mém. de la Real Acad. Cienc. Madrid*, XXV) refer to zoogeography and other details. But the most up-to-date and comprehensive work on the subject is that of Schilder and Schilder (*Proc. Malac. Soc. London*, Vol. XXIII, pp. 119-231, 1939) which shows marked improvements in the nomenclature and classification of cowries. It is astonishing to learn that while completing that monumental work the distinguished couple spared no pains to examine about 60,000 shells or more of living Cypraeidae obtained from more than 2,200 localities, and consulted about 2,500 papers. This not only shows

their tenacity and devotion to work, but at the same time displays the extent of the subject, its richness of literature and the great interest it has created in the public as well as in the scientific mind since very early times.

HABITS AND HABITATS

The cowries are very shy, hardy and sluggish creatures which occur in great abundance on the submerged rocks and coral reefs of our shallow seas to feed chiefly on coral animals and other micro-organisms. Like the shell, the mantle (which Rutherford Platt¹ considers as 'a bait of animated skin') is also variegated with colours. Its two thin, unequal lobes with frilled margins come outside through the long and narrow aperture of the shell (s.), extend over its dorsal surface on both the sides and cover it either partially or wholly. This peculiar contrivance serves two very useful purposes; firstly, to save the shell and the animal from the attack of enemies, and, secondly, to attract other organisms forming its food. Woodward in his Manual of the Mollusca (1856) mentions that Adams observed the pteropodous fry of *Cypraea annulus* adhering in masses to the mantle of the parent, or swimming in rapid gyrations or with abrupt jerking movements by means of their cephalic masses.

It is true that the cowries have now mostly disappeared from the cold waters of the European seas, but as Stoliczka points out (Cret. Faun. S. Ind. II, p. 51, 1868): 'there is ample evidence, that they were formerly very numerous in the Vienna, Paris, and other districts or basins'. Their presence in large numbers in the warm seas of the tropics at the present time shows that they have found sufficiently encouraging and congenial climatic conditions to carry on their normal life and activities. There might be some reasons responsible for this wonderful upheaval or upset in the faunal development which adversely affected the ecological conditions so favourably influencing the life, growth and proliferation of this shellfish in the European seas. At present the range of distribution of the cowries appears to be confined mostly to the warm waters of the tropics extending from the Persian Gulf, Gulf of Oman, Gulf of Aden, Red Sea, Arabian Sea (including the east coast of Africa) on the west and thence *via* Indian Ocean, Gulf of Manaar, Bay of Bengal as far as Hawaii or even beyond in the Pacific on the east. Geologically speaking, the cowries commenced in the Cretaceous, but have largely augmented in the number of species at the present time. One species is also recorded from the Upper Jurassic of Sicily. It is interesting to note here that in pre-historic graves in the Baltic countries and elsewhere one finds cowries along with other shells and animal remains discovered by archaeological explorations, which undoubtedly proves the antiquity of their close connection with human culture and civilization. Specimens of *C. annulus*, as stated by Woodward (p. 121), were found by Dr. Layard in the ruins of Nimroud. Furthermore, records from pyramids and tumuli show that both the dark queens of the east and fair princesses of the north clasped some favourite pearls or cowries as they were laid to their eternal rest.

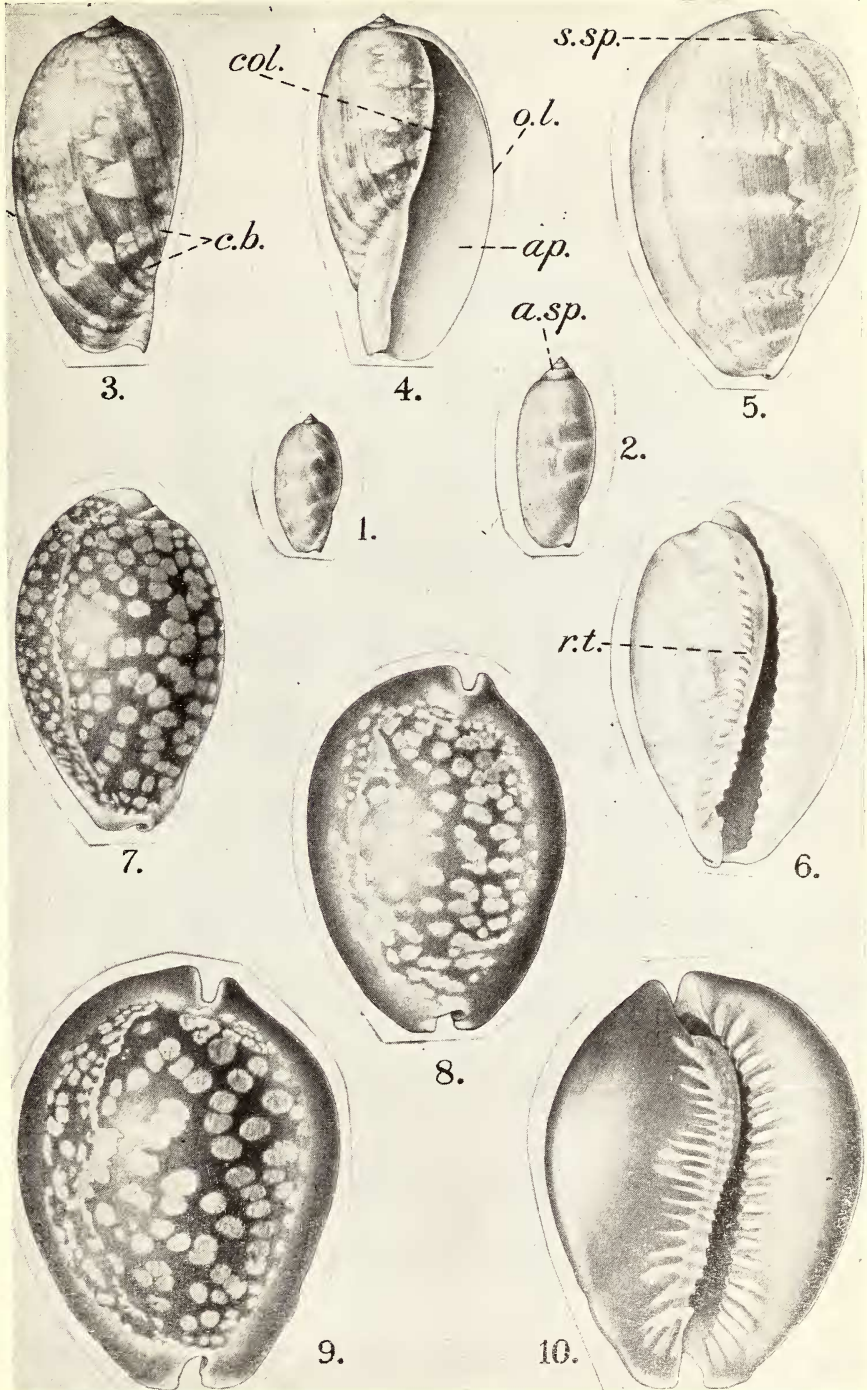
¹ Platt, R. *Nat. Geogr. Mag.* XCVI, No. 1, July, p. 39 (1949).

TRANSFORMATION

The cowry shells undergo such wonderful changes both of form and colour at different phases of their growth that they at once remind us of the remarkable phenomenon of metamorphosis in insects and *Leptocephalus* (the larva of eel). The different stages are diagrammatically shown in Plate II as observed in a series of shells of *Mauritia mauritiana* (Linn.) available in our named collections. The first stage of development begins with a simple convolution of the shell around the columellar axis in the form of a long drawn-out bulla and hence the name 'Bulla-state' (Figs. 1-4). It is chiefly characterized by a depressed or acuminate spire (a. sp.), long and wide aperture (ap.), smooth and rounded columella (col.) or inner lip appearing somewhat twisted and curved anteriorly, thin and curved outer lip (o. l.) and attractive colouration and markings usually diffused in bands (c. b.) or wavy lines. But sometimes very fine and delicate striations are also found on the inner lip which extend for some distance over the dorsum. In the second epoch of growth the shell (Figs. 5, 6) gradually solidifies, the spire begins to sink below (Fig. 5, s. sp.), the outer lip and columella begin to thicken and consequently the aperture becomes narrowed, the rudimentary teeth (r. t.) make their appearance on the lips from below upwards and the dorsal surface becomes overlaid with a strong coat of gorgeous colouring matter, also diffused in obscure bands or waves. Later the shell (Fig. 7) becomes ventricose with the sides more thickened, the teeth more strengthened, the aperture more narrowed and the acuminate spire completely absorbed or remaining only rudimentary in some cases. Finally the growth of the shell is completed by a light fabric of colouring matter deposited in lines, blotches, waves or reticulations of various hues and pattern (Figs. 8, 9). The ornamental character with which the dorsal surface is usually painted appears to be the last effort, says Reeve, in the formation of the shell, but that does not appear until the latter is on the eve of maturity, the most richly variegated layers of enamel are reserved for the final decoration. *Cypraea mappa* happens to be an exception to this general rule, because a layer of pale hieroglyphical painting greatly resembling that of *C. arabica* is deposited here by the animal on the left side chiefly when yet in a very immature state of growth. On arriving at maturity another richer layer of the same pattern is superimposed on the former. Thus the shell in the 'Bulla-state' looks so unlike the adult as to give little clue to its affinities with the latter. Reeve has given a few interesting examples showing the different stages of growth of the shell from the bulla-state to the adult form and I am also adding a few more in my work on the revision of cowries.

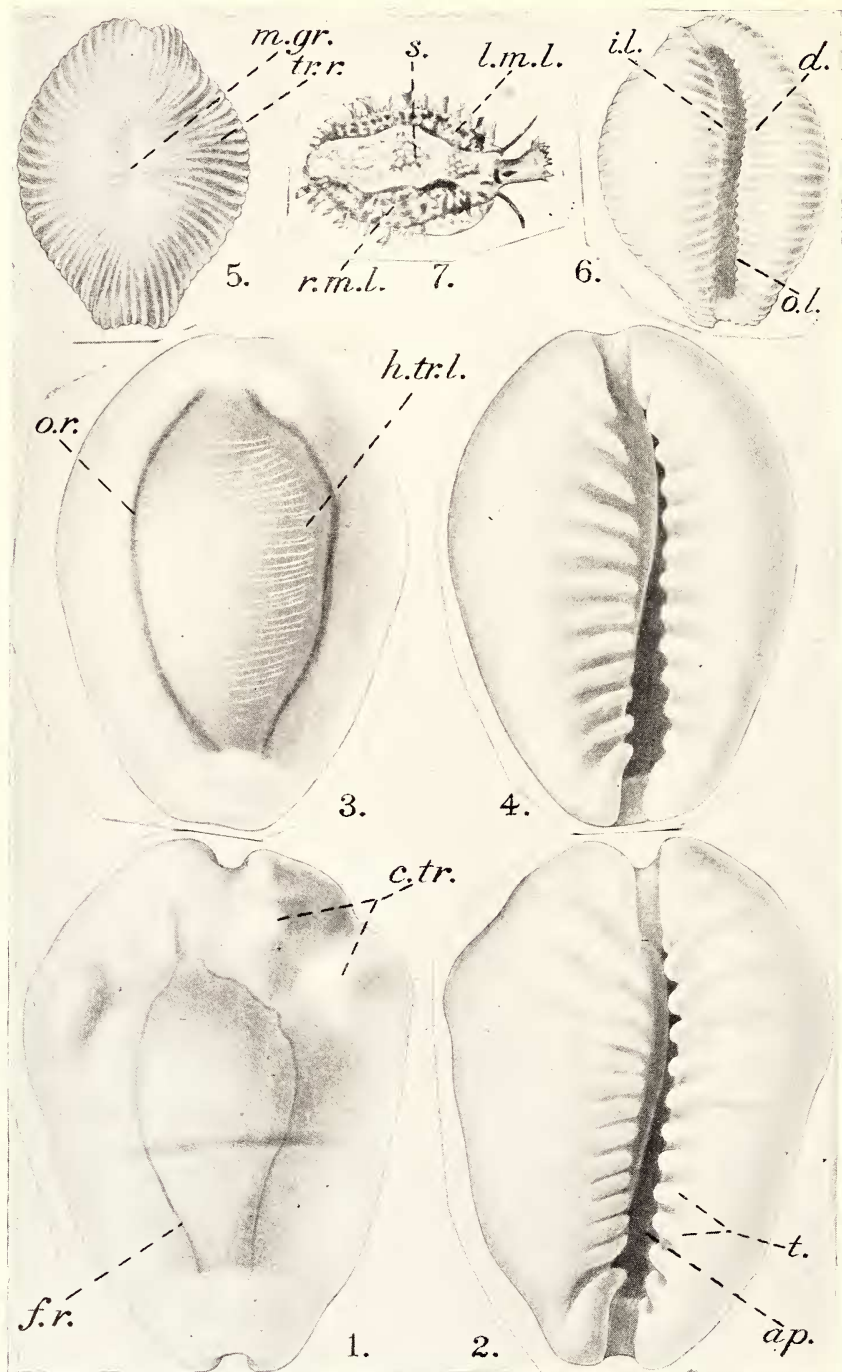
USES

The importance of cowries has been realized by men in various fields, of which the most remarkable is their use as a medium of exchange (replacing the old barter system). This practice which was so exceedingly common amongst the civilized and uncivilized people in all parts of the globe and developed into flourishing trade and commerce has not yet completely died out. One of the commonest species thus



A. K. Mondal, del.

Transformation of shell in *Mauritia mauritiana* (Linn.)



A. K. Mondal, del.

employed was 'money-cowry' or 'prop-shell', *Monetaria moneta* (Linn.), which stands almost alone in being used entire (Pl. I, Figs. 1, 2), while all the other forms of shell money are made out of portions of the shells and thus entail more time, labour and care. This species can easily be distinguished by its thick, strong, triangularly-ovate shell of whitish to pale yellowish colour (sometimes with a bluish tint) bearing callous dorsal tubercles (c. tr.) of varying size and a faint ring (f. r.). The teeth are mostly extended and tuberculated, especially posteriorly. These peculiarities which are so simple and easy to detect, but not so readily subject to erosion and decay (excepting colouration), perhaps led the early people to select this particular type as currency. *Ornamentaria annulus* (Linn.) or 'ring-cowry', as it is commonly called, is another species (Pl. I, Fig. 3) which is none the less important than its ally, *M. moneta*, and is always found in close association with the latter in the sea. It is more extensively used as ornaments than as currency, as the generic name *Ornamentaria* indicates, but lacks entirely the dorsal tubercles, though it possesses a well-defined orange-ring (o. r.) instead. This possibly earns for it the popular name 'ring-cowry'. Some very fine hair-like transverse white lines (h. tr. l.) are also found within the ring. Shells of this type are known to have been used as ornaments in Oceania, but have also been disseminated for centuries through Southern Asia, Southern Europe and finally to America.

Marco Polo, the well-known Italian adventurer and explorer who wrote an excellent account of the Chinese culture and civilization after his memorable voyage to China, relates finding cowries circulating as currency in Yunnan in the thirteenth century. In a Hindu treatise of 700 A.D. mention is also made of the use of cowries as money. Owing to similar use almost exclusively in some parts of Africa, the cowry trade flourished greatly. This encouraged the despatch of several cargoes of cowries annually to Wydah and Lagos, fished from the Maldive and Laccadive Archipelagoes in the Arabian Sea. In Africa they were exchanged with the slave traders for the Spanish doubloons they received from the sale of slaves. This mean but profitable trade continued till the Brazilians stopped the introduction of African slaves into their country. Till not long ago cowries were imported from India and other places into England to be paid to the natives of W. Africa in exchange for their products. In countries near the Niger, excepting N. Ashantee, prevailed a peculiar system of exchange of gold dust and the gera or cola-nut (*Sterculia acuminata*) with the cowries. A load of sixty pounds of the nuts was considered equivalent in value to fifteen thousand cowries. Another golden opportunity came for the cowry trade when the Sultan of Borneo reformed his currency and introduced the Spanish doubloon (in place of the cotton-cloth, which had hitherto been the medium of exchange) with cowries at the rate of four thousand to the doubloon for small change.

Besides use as currency, there is plenty of evidence in the Ayurvedic literature relating to the medicinal value of cowries. The Hindu women in some parts of our country look upon cowries, especially *Monetaria moneta* and *Ornamentaria annulus*, with veneration as a symbol of wealth and prosperity and, as such, never allow